

Atty Dkt.: 36960-1
Serial No. 10/508,990

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JAN 14 2008

Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

1-46. (Cancelled)

92. (New) An apparatus for medical screening and diagnosis by dual detection of stethoscopic and Doppler signals, comprising a sound-transmitting linking conduit connected, at one end, to a housing which at least partially forms an ear trumpet provided with a membrane, and, at the other end, to at least one earpiece for listening to a stethoscopic signal coming from the ear trumpet, wherein the housing is coupled to at least one ultrasound probe positioned to permit converging reception of ultrasonic and stethoscopic signals, through the membrane; and wherein the ultrasonic probe is at an angle of about 30-70 degrees relative to the membrane, and is connected to a transducer processing circuit capable of supplying from a Doppler signal, an audio signal by coupling the processing circuit to a loudspeaker for stethoscopic-type listening, an audio and video signal, by coupling the processing circuit to viewing means, said processing circuit configured to provide converging stethoscopic-type listening and video signal viewing.

93. (New) The apparatus of claim 92, which further comprises means provided for delivering and forming a film of a semi-solid product on the skin of a patient, for achieving an intimate contact between skin of the patient and the housing and for channeling wave propagation.

94. (New) The apparatus of claim 92, wherein the loudspeaker is arranged substantially against the ear trumpet so that the audio signal is amplified by the ear trumpet and renders the stethoscopic sound perceptible at the earpiece by the linking conduit.

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95. (New) The apparatus of claim 92, which further comprises a microphone which is coupled to the ear trumpet to detect the stethoscopic sound signal and transmit it, in a form of an electrical signal, to the processing circuit and produce a video signal.

96. (New) The apparatus of claim 92, wherein the viewing means are in the form of a liquid crystal screen permitting graphic display of a stethoscopic and Doppler signal, or in the form of a module with light-emitting diodes.

97. (New) The apparatus of claim 92, which further comprises a microprocessor controlled by an interpretation algorithm and coupled to the processing circuit in order to permit analysis and a combination of stethoscopic or Doppler measurements or both, delivered by the processing circuit or detected from stethoscopic listening, and to supply a provide stethoscopic diagnosis, Doppler diagnosis or cross diagnosis or a combination thereof.

98. (New) The apparatus of claim 92, which further comprises a display module with three light-emitting diodes which is mounted on the housing, which provides an interpretation and a diagnosis based on the measurement of the Doppler signal or a cross diagnosis based on an interpretation algorithm by giving preference to the Doppler diagnosis when the interpretations are divergent, each diode of the module emitting in a specific color corresponding, respectively, to a positive diagnosis, a negative diagnosis, or a non-interpretable result in the case where at least the Doppler measurement is not interpretable.

99. (New) The apparatus claim 98, wherein instead of displaying a non-interpretable result when at least the Doppler measurement is non-interpretable, diagnosis is based on measurement of the stethoscopic signal, each diode of the module emitting in the specific color corresponding, respectively, to a positive diagnosis, a negative diagnosis, or a noninterpretable result; and wherein a case where the stethoscopic signal is not interpretable, or of malfunction of the apparatus, the diagnosis is based on the stethoscopic sound signal.

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100. (New) The apparatus of claim 92, which further comprises, a system of recording and viewing the Doppler or stethoscopic video signal is provided by wireless connection between the electronic processing circuit and a viewing or printing module.

101. (New) The apparatus of claim 92, which further comprises peripheral outputs in order to permit a connection to a microcomputer and optionally to an audio headset.

102. (New) The apparatus of claim 92, which further comprises for use of the ultrasound probe with aid of a finger, an electrical circuit for powering the ultrasound probe, controlled by an actuator which can be mounted on the linking conduit or on the housing.

103. (New) The apparatus of claim 102, wherein the actuator is a multifunction switch which serves also for selective control of a means for supplying stethoscopic, Doppler or cross diagnoses by the viewing means, of a means for triggering a diagnosis from measurements delivered by the processing circuit or picked up from listening, and to a system for recording and remote viewing, the multifunction being realized by different stages identified by a decision table or a logic unit for programming the connections of the circuits as a function of the number of times the actuator is activated.

104. (New) The apparatus of claim 92, which further comprises a power supply, which is a cell or rechargeable battery.

105. (New) The apparatus of claim 92, wherein the housing forms the ear trumpet accommodating the ultrasound probe, in a centered manner, and contact means are provided to be interposed temporarily between the ultrasound probe and the membrane of the ear trumpet, in order to transmit a Doppler signal to the processing circuit coupled to the loudspeaker which emits the audio signal amplified in the ear trumpet.

106. (New) The apparatus of claim 105, wherein the contact means of interposition comprises an inflatable balloon covering a distal end of the ultrasound probe and a device for

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inflating the balloon with liquid.

107. (New) The apparatus of claim 106, wherein the inflating device comprises a tubing which brings the balloon into communication with a source of liquid, and means configured to drive liquid from the source into the tubing.

108. (New) The apparatus of claim 105, wherein the contact means of interposition between the ultrasound probe and the membrane is controlled from outside the ear trumpet by an actuator button.

109. (New) The apparatus of claim 108, wherein the contact means controlled from outside the ear trumpet to tilt the ultrasound probe is provided in connection with the actuator button.

110. (New) The apparatus of claim 109, wherein the means to tilt the probe comprises at least one cable, of which one end is fixed to the end of the ultrasound probe, and means configured to pull the other end of the cable and tilt the end of the probe in order to orient it toward the sound response most perceptible at the earpiece.

111. (New) The apparatus of claim 108, which further comprises a circuit which powers the ultrasound probe and which is controlled by the actuator button.

112. (New) The apparatus of claim 108, which further comprises a circuit which records the Doppler signal and which is controlled by the actuator button.

113. (New) The apparatus of claim 109, wherein the actuator button and contact means provide a flow of liquid when the actuator button is released, the means comprising a plunger made of a magnetic material for driving the liquid, and an electromagnetic coil applying a magnetic force for holding a plunger.

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114. (New) The apparatus of claim 92, wherein the ultrasound probe is accommodated in the housing and outside the ear trumpet, the housing forming a substantially cylindrical turret.

115. (New) The apparatus claim 92, wherein the ultrasound probe is accommodated partially in the housing and partially outside the housing, the ultrasound probe passing through the housing by means of a sealing ring which mechanically isolates the ultrasound probe.

116. (New) The apparatus of claim 115, wherein the housing has a lower part curved in its central area.

117. (New) The apparatus of claim 92, wherein the ultrasound probe is outside the housing, which is reduced to an upper part for signal processing, the ultrasound probe being fixed along the ear trumpet.

118. (New) The apparatus of claim 114, in which the ultrasound probe is inclined toward the central axis of the ear trumpet by an angle between about 40 and 55 degrees.

119. (New) The apparatus of claim 114, in which the housing has a turret shape being substantially cylindrical and of ovoid cross section, wherein the turret is limited by an upper face, at the center of which the linking conduit emerges, and by an open lower face where the membrane of the ear trumpet and the end of the probe are positioned.

120. (New) The apparatus of claim 114, wherein the ultrasound probe is prolonged, and means are provided for delivering a semi-solid product forming a connecting layer between the end of the continuation of the ultrasound probe and the skin of the patient.

121. (New) The apparatus of claim 119, which further comprises a plunger which controls a semi-solid product and is accessible from the housing, in particular from the upper face, a switch for powering the ultrasound probe also being arranged on the housing.

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122. (New) The apparatus of claim 121, which further comprises a reservoir arranged in the housing, a gel being delivered through a flexible tube by an ejection nozzle situated in contact with the lower face of the turret, and a thrust of the plunger making it possible to dose the correct quantity of gel delivered via the nozzle.

123. (New) The apparatus of claim 114, wherein the ultrasound probe is connected to a loudspeaker, mounted on an outer face of the ear trumpet by a transducer circuit, the Doppler signal is converted by the transducer circuit in order to supply an audio signal by the loudspeaker, the sound being amplified in the ear trumpet, propagated in the linking conduit, then listened to at the earpieces.

124. (New) The apparatus of claim 123, which further comprises interpretation software which controls a microprocessor of a microcomputer coupled to an output provided on the housing comprising means for retrieving and storing results of stethoscopic or Doppler listening or both.

125. (New) The apparatus of claim 124, wherein the microcomputer is equipped with a screen which shows the graph of the Doppler signal after the Doppler signal has been converted by the circuit and also transmitted to the microcomputer and stored in the form of a video signal via the output.

126. (New) The apparatus of claim 124, wherein the interpretation software provides a diagnosis on a basis of evaluations which have been retrieved and stored, with a display module with at least one light emitting diode, which is mounted on the housing and coupled to the transducer circuit for viewing the interpretation.

127. (New) The apparatus of claim 92, which further comprises a display module for viewing and printing situated at a remote point, which receives video signals.

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128. (New) The apparatus of claim 127, which further comprises an antenna to emit video signals picked up by a receiver of the viewing module, for further processing in a demodulator and in a viewing adapter.

129. (New) The apparatus of claim 127, which further comprises a headset output to permit stethoscopic listening based on the sound or based on the Doppler signal converted into an audio signal.

130. (New) The apparatus of claim 127, wherein the video signals, or audio signals or both, after pickup, are transmitted to a microprocessor for evaluation and are viewed on the screen of a microprocessor.

131. (New) The apparatus of claim 127, further comprising the display module with light-emitting diodes showing a direct or cross interpretation based on the Doppler and stethoscopic video signals.

132. (New) The apparatus claim 93, wherein the semi-solid product is in a form of a gel.

133. (New) A method of effecting medical screening and diagnosis, which comprises effecting dual detection of stethoscopic and Doppler signals to effect said screening and diagnosis using the apparatus of claim 92.

134. (New) The method of claim 133, wherein the apparatus is used to screen cardiovascular disease by measuring systolic pressure to establish a Systolic Pressure Index (SPI).

135. (New) The method of claim 134, wherein the screened cardiovascular disease is an incipient arterial disease.

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136. (New) The method of claim 135, wherein the arterial disease is of coronary or carotid arteries or both.